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SURVEY OF TRUCKING BY OWNER-OPERATORS
Report #TE-86-7

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BUT

Ce rapport a pour but de démontrer que les camionneurs, en particulier les propriétaires-chauffeurs, sont prêts à passer à l'action dans le but d'améliorer l'économie de carburant de leurs camions.

SOMMAIRE D'OBSERVATIONS

1. Les propriétaires-chauffeurs de camions travaillent beaucoup. Les chauffeurs de tracteurs travaillent de 12 à 15 heures par jour. Les chauffeurs de camions simples travaillent de 9 à 10 heures par jour. Ces deux types de chauffeurs sont presques toujours seuls pour conduire leur camion.

2. Les propriétaires-chauffeurs connaissent très bien leurs camions. Approximativement les trois quarts font eux-mêmes leurs réparations et leur entretien.

3. Les propriétaires-chauffeurs sont des hommes d'affaires qui vendent leurs services aux manufacturiers, aux grossistes, et aux courtiers en camionnage. Ils négocient leurs prix, et font leurs propres factures.

4. La valeur de remplacement de leur équipement excède généralement $100,000 pour un ou plusieurs camions, pour une ou plusieurs remorques et un camion léger ou une automobile.

5. Les cinq facteurs les plus importants d'un nouveau camion tels que répertoriés par les propriétaires-chauffeurs sont: la sécurité et la durée de l'investissement, l'adaptabilité du camion aux besoins et aux conditions, l'économie de carburant, le prix d'achat et le réseau des fournisseurs de camions.

6. Le prix élevé du carburant est un problème majeur pour les propriétaires-chauffeurs.

7. La plupart des propriétaires-chauffeurs s'intéressent beaucoup à la réduction de leurs coûts d'opération.

8. Les propriétaires-chauffeurs croient que les gouvernements ne sont pas une source utile de renseignements sur l'économie de carburant.

9. La plupart des propriétaires-chauffeurs s'intéressent aux programmes entrepris par les fournisseurs de camions et d'équipement, ou les magazines de camionnage. Par contre, ils ne s'intéressent pas beaucoup aux programmes offerts par les gouvernements. Une explication partielle pour ce manque d'intérêt, peut provenir du fait que les propriétaires-chauffeurs ont peu de contacts avec les organismes du gouvernement et, par conséquent, ne s'attendent pas à ce qu'il y ait des programmes gouvernementaux axés sur la réduction des coûts de carburant et d'opération.

EXECUTIVE SUMMARY

Purpose

The purpose of this report is to indicate the willingness of Canadian truck drivers, especially owner-operators of trucks, to take action to improve the fuel economy of their trucks.

Summary of Observations

1. Owner-operators of trucks work hard. Tractor operators work 12 to 15 hours per day. Straight truck operators work 9 to 10 hours per day. Both drive solo nearly all the time.

2. Owner-operators of trucks are very knowledgeable about their trucks. Approximately three quarters of them do their own repairs and maintenance.

3. Owner-operators of trucks are small businessmen. They sell their services to manufacturing, wholesaling, retailing, and brokers of transportation services. They conduct their own negotiations on prices, and do their own invoicing.

4. The replacement value of the capital equipment owned usually exceeds $100,000, which includes at least 1 or more trucks, 1 or more trailers, and a light truck or car.

5. The five most important factors in a new truck considered by owner-operators are: reliability, adaptability to the application, fuel efficiency, purchase price, and available dealer network.

6. High fuel cost is a major problem for owner-operators.

7. Most owner-operators are vitally interested in reducing operating costs.

8. Owner-operators believe that governments are not a useful source of information concerning fuel economy.

9. Most owner-operators are interested in programs run by truck and equipment dealers, or trucking magazines. By contrast, they are not very interested in programs offered by government. Part of the explanation for this response could be that owner-operators have very little contact with governmental organizations, and consequently do not expect governmental programs aimed at reducing fuel and operating costs.

1. INTRODUCTION

1.1 Background

The Transportation Energy Division of Energy, Mines and Resources Canada recognizes that diesel fuel oil as a percentage of total distillate is growing. This situation raises the following questions:

1. Is there an opportunity to reduce the fuel consumption of trucks? If so, what are the opportunities?

2. What are the trends and opportunities to use various kinds of fuel in trucks?

3. What action, if any, should the government of Canada take in order to encourage improved fuel efficiency in the trucking fleet?

When considering the answers to these questions, one must take into account the willingness of truckers, especially owner-operators, to improve the fuel economy of their trucks. The reason that no attitude survey of owner-operators has been done in the past is that owner-operators are almost impossible to contact because they spend as much as 60 to 70 hours per week on the road in their trucks. The magazine "Trucking Canada" undertook this attitude survey using a methodology aimed at getting the maximum response possible from owner-operators.

1.2 Questionnaire

The following pages contain the questionnaire.

FIGURE 1

PLEASE PULL OUT AND MAIL TODAY!

Win a New Ford Ranger!

1986 Ford Ranger XLT. Options include V6 engine, power steering and brakes, am/fm/cassette stereo, bucket seats, light group, cast aluminum wheels, and western swingaway mirrors.

Prize truck not exactly as illustrated

That's right. you can win a brand new Ford Ranger pickup truck, courtesy ***Trucking Canada,*** if you just take a few minutes to help us out.

The prize truck is a terrific 1986 Ranger XLT with the long wheelbase option, V6 engine, and lots more. ***Retail value is approximately $11,500, and we'll pay freight, sales tax, and preparation charges.*** All you'll have to do is drive it away. It's a great little pickup that you'd be proud to have in your driveway.

And it can be yours, free!

Here's how this exciting ***Trucking Canada*** giveaway works. Fill out the questionnaire and the entry form attached (next page), tear it carefully out of the magazine, and mail it back to us at either our western or eastern offices.

Trucking Canada
4250 Dawson St.
Burnaby, B.C.
V5C 4B1

Trucking Canada
109 Vanderhoof Ave.
Toronto, Ont.
M4G 2J2

We'll put your entry form in a barrel and we'll draw the winner's name at the Com Car Owner-Operator's Trade Show in Kitchener, Ont., on November 9, 1985. Look for details of the show in coming issues of ***Trucking Canada.***

If you're not at the show to accept your prize, we'll get in touch with you by telephone.

It's that simple.

Why do we want to know about you? That's simple too. ***Trucking Canada*** is ***your*** magazine, so we want to make sure it contains the kind of stories you want to read. If we're going to do that job well, we've got to know something about your operation and about what's important to you.

So this questionnaire is part of our continuing effort to serve you better. And by answering our questions you'll be helping us to keep ***Trucking Canada*** interesting and relevant to truckers right across the country. You might even win that great 1986 Ranger pickup!

We should say one more thing. Your answers to our questions will be held in strict confidence.

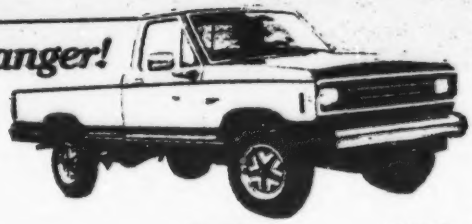
Thanks for your help!

WESTERN EDITION EASTERN EDITION

TRUCKING CANADA

Canada's #1 magazine for owner/operators and independent truckers

Win a New Ford Ranger!



mber of smission peeds?	Top Speed?	Estimated Miles Per Gallon?	Estimated Cost Per Mile?	Vehicle Make?	Model?	Year?
_Speed	____MPH	____MPG	$_____	_____	_____	19____
_Speed	____MPH	____MPG	$_____	_____	_____	19____
_Speed	____MPH	____MPG	$_____	_____	_____	19____
_Speed	____MPH	____MPG	$_____	_____	_____	19____
_Speed	____MPH	____MPG	$_____	_____	_____	19____

OPERATORS PLEASE GO TO QUESTION 4]

____ Type of Trailer _____

?	Tanker?	Logging?	Dump?	Feed Grain?	Other? (Specify)	
	5	6	7	8	9	_____
	5	6	7	8	9	_____
	5	6	7	8	9	_____

We also want to get your opinion on the following:

8. Which of the following subjects would you like to see covered in Trucking Canada? [CIRCLE ONE OR MORE NUMBERS]

Fuel-saving add-ons	1
Truck and equipment tests and specs	2
Information on government regulations	3
Tips on tire and wheel selection	4
News about the industry	5
Cost-saving driving tips	6
How to keep operating costs down	7
Maintenance tips	8
Stories about owner-operators	9
Humour	10
Tips on reducing fuel costs	11
Business management advice	12
Safety	13
Other (specify) _____	14

9. Owner-operators can get trucking information from many sources. How useful do you find the following? [CIRCLE ONE NUMBER FOR EACH]

	Very Useful	Somewhat Useful	Not Useful	No Opinion
Truck and equipment dealers	1	2	3	4
Trucking magazines	1	2	3	4
Mechanics	1	2	3	4
Government trucking information	1	2	3	4
Other owner-operators	1	2	3	4
Truck stops	1	2	3	4
Other (specify) _____	1	2	3	4

10. How interested are you in participating in programs that could show you how to reduce fuel and operating costs if these were provided by: [CIRCLE ONE NUMBER FOR EACH]

	Very Interested	Somewhat Interested	Not Interested	Do Not Know
Truck and equipment dealers?	1	2	3	4
Trucking magazine	1	2	3	4
Government?	1	2	3	4
Trucking associations?	1	2	3	4

(Final questions on back page)

1.2 Purpose

The purpose of this study is to indicate the willingness of Canadian truck drivers, especially owner-operators of trucks, to take action to improve the fuel economy of their trucks.

1.3 Methodology

Trucking Canada developed the questionnaire shown in Figure 1, and published it in the July-August and September-October 1985 editions of Trucking Canada. The questionnaire asks the truck drivers and owner-operators to write their answers on the form and mail it to Trucking Canada at the addresses shown on the form.

The magazine, Trucking Canada, was sent to about 35,000 truck drivers and owner-operators of trucks. As an incentive to motivate readers to respond, the returned questionnaires were put into a barrel from which was drawn a winner who received a 1986 Ford Ranger XLT. Approximately 1,840 responses were received.

This attitude survey aimed at measuring attitudes and measuring how strongly the attitudes were felt. The assumption was made, therefore, that readers who did not respond did not have strong feelings on the topics in the questionnaire. In addition, readers who did respond to some but not all of the questions were assumed to have strong feelings only on their responses, and ambivalent views on the unanswered questions. Finally, questions concerning fuel economy were asked in several different ways, as parts of several questions, with the objective of more clearly revealing the reader's true feelings, and indicating the strength of those feelings.

Almost one third of the questions attempted to identify special characteristics of owner-operators, such as how long had he been a truck driver, whether he was self-employed, what kind of truck he drove, what kind of loads he hauled. These questions allowed the analyst to discover the extent to which the attitudes expressed were related to the owner-operator's special circumstances.

2. CHARACTERISTICS OF OWNER-OPERATORS ACCORDING TO THE STUDY

Typically owner-operators started their careers driving a truck for a transport company where they learned the trucking business. After approximately six years, they started their own businesses, by purchasing second-hand tractors or straight trucks on credit, repairing and maintaining the tractors themselves, and hauling for either the same transport company, or a competing broker of transport services, or a private carrier, or a manufacturing or distributing company which does not have its own trucks. Typically, owner-operators are very knowledgeable about their trucks and their businesses.

In order to earn a profit in such a highly competitive business, owner-operators work hard. Owner-operators of tractors are typically on the road 12 hours per day but 15% of them exceed 15 hours per day. They typically drive 91,000 miles per year but 15% of them exceed 125,000 miles per year. Owner-opertors of straight trucks are typically on the road 9 hours per day but 15% of them exceed 11 hours per day. They typically drive 45,000 miles per year but 15% of them exceed 70,000 miles per year.

Nearly all owner-operators drive solo. Approximately 36% of Canadian tractor operators drive in the U.S.A.; approximately 30% drive in more than one province.

The answers to the following questions support the characteristics just described.

Question 1

The response shows that 17% of tractors and 12% of straight trucks are more than 10 years old. Those trucks were probably purchased second-hand when the owner-operator started his own business but had insufficient down-payment for a new truck. Trends in the Canadian Truck Market[1] indicate typical pricing to be 45% of new vehicle price when the vehicle is three years old and 25% of new vehicle price when it is 5 years old.

Question 13: How long have you been a truck driver?

The average of the responses is 15.9 years with a standard deviation of 9.1 years. Approximately 15% of owner-operators have driven a truck for more than 25 years.

Question 14: How long have you been an owner-operator?

The average of the responses is 9.8 years. Approximately 15% of owner-operators have been owner-operators for more than 18 years.

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1. D.S. Van Dusen, Trends in The Canadian Truck Market, TE-86-2A, Transportation Energy Division, Energy, Mines and Resources Canada, page 26, July 1985.

3 CHARACTERISTICS OF OWNER-OPERATORS' EQUIPMENT ACCORDING TO THE STUDY

Approximately 62% of vehicles operated by owner-operators are highway tractors. The remainder are straight trucks. About 3/4 of these vehicles ride on radial tires which improve fuel economy when compared with bias-ply tires. Approximately 15% of these vehicles are leased.

3.1 Highway Tractors

Between 75% and 80% of highway tractor operators operate only one tractor whereas about 4% of them operate 5 or more tractors. Only 1/3 of these tractors have wind deflectors aimed at improving fuel economy. The average engine size is about 335 H.P. but engine power has been increasing from about 290 H.P. in 1969 models to 370 H.P. in 1985 models. Typically, 400 H.P. is provided by tractor manufacturers aiming their product at owner-operators. These companies include Kenworth, Freightliner, Peterbilt, and Western Star. The average number of speeds in the transmissions is about 12, but Freightliner and Kenworth typically provide 15 speeds whereas Western Star and Peterbilt provide about 14 speeds. The average top speed of tractors has increased from about 62 MPH in 1969 to 72 MPH in 1985. The 400 H.P. engines from the previously mentioned companies averaged a top speed in 1985 of between 75 MPH and 77 MPH. The average fuel consumption was close to 7 MPG in 1970, declining to 6 MPG in 1980 and improving to 7 MPG again in 1985. The high-powered tractors from Kenworth, Freightliner, Peterbilt, Western Star, were below the average at about 6 MPG whereas the smaller tractors of Ford, G.M.C. and IHC were above the average at 7.1 MPG to 7.3 MPG. Interestingly, the cost per mile to operate the tractors was about $0.70 no matter which make of tractor was selected. The wide variation in costs (standard deviation being $0.33) indicates big differences in accounting systems and therefore what is included in the cost per mile.

3.2 Straight Trucks

The characteristics of engine size, average number of transmission speeds, and top speed were reported to be the same for the straight trucks as were reported for the tractors. Fuel consumption, however, was only about 5.6 MPG by 1985. These fuel consumption rates are worse than those for highway tractors because straight trucks make shorter trips with more stopping and starting. As a result, operating costs are somewhat higher at $0.74 but again, the wide variation in costs (standard deviation being $0.34) indicates big differences in accounting systems and therefore what is included in the cost per mile.

3.3 Trailers

Approximately 70% of tractor operators occasionally provide both tractor and trailer, whereas the remaining owner-operators haul a trailer owned by their customers.

Table 1 shows the kinds of trailers that owner-opertors haul. Of the trailers owned by owner-operators, flat decks are by far the most common, followed by vans, logging trailers and dump trailers. These proportions correspond approximately to the market segments served by owner-operators most frequently, or where profits are higher as in logging, sand, gravel and stone, or refrigerated foods. Of the trailers owned by the customer, vans and flat decks combined make up about 50%. Manufacturers and distributers probably own their own trailers so as to take more time filling them but hire owner-operators to haul them in order to minimize their transportation costs.

TABLE 1

TYPE OF TRAILERS HAULED

TYPE	OWNED BY OPERATOR (per cent)	HAULED FOR OTHERS (per cent)
Van	14	25
Bulk	3	5
Flat Deck	24	24
Refrigerated	8	10
Tank	5	7
Logging	13	5
Dump	15	10
Feed	5	4
Other	13	10
TOTAL	100%	100%

3.4 Personal Vehicles

When owner-operators are not driving their highway tractors or straight trucks they drive the following vehicles:

Vehicle Type	Proportion %
Car	38
Pick-up Truck	40
4 x 4	16
Other (van)	6
TOTAL	100

The most common type of vehicle mentioned in "other" is a van. Consequently, the personal vehicle owned by about 60% of owner-operators is some type of truck, whereas about 3/4 of vehicle owners in general own a car. This difference can be explained by the following:

1. Owner-operators feel comfortable driving trucks;

2. Owner-operators use their personal vehicles in their business, - carrying spare parts for repairs, or picking up small cargo as a special service to their customers.

Since modern pick-up trucks, vans, and 4 x 4's are nearly as comfortable as cars, owner-operators are optimizing their personal vehicle for both personal and business use, while perhaps minimizing their taxes by claiming a capital cost allowance on their personal vehicle.

4. CHARACTERISTICS OF OWNER-OPERATORS' BUSINESS

4.1 Customer

Approximately 30% of owner-operators in the study reported that they drove for a company in the manufacturing, wholesaling, or retailing business. Approximtely 33% of respondents indicated that they drove for a licensed for-hire carrier, incuding brokers who typically hire owner-operators to pick-up goods and deliver them while the broker does the sales and administration. Most of the remaining 37%, who responded "other", specified that they were self employed. That response presumably means that the owner-operator, instead of serving mainly one customer, serves several customers who may be private companies or brokers, and who hire him only when they have more goods than their regular owner-operators can carry.

4.2 Method of Payment

Approximately 33% of owner-operators responded that they were paid by the mile. About 25% of respondents were paid a percentage of the revenue obtained by the broker for the load being carried. The remaining 42% were paid by many different arrangements. The following are the most common:

1. Cubic yard of gravel
2. Tonne-mile
3. Hour
4. Negotiated for each job or contract
5. Weight.

From this information, the conclusion can be reached that the business is very competitive, and that much negotiation occurs as customers and suppliers try to maintain sales volumes profitably.

4.3 Fuel Costs

High fuel cost was the one problem identified by nearly all of the respondents as a problem. Fuel costs are approximately equal to 11% of revenue. Owner-operators probably feel that they have no control over these costs, and therefore perceive them to be a major problem, especially in comparison with the other 7 items mentioned in question 11 which affect their profits only slightly.

Petroleum refiners sell their diesel fuel in large quantities at prices greatly discounted from pump retail prices. In order to take advantage of these deep discounts, owner-operators buy their fuel at the depot of the licensed broker for carriers whenever possible. When on the road away from the depot, the driver uses his credit card or key lock, both of which provide him discounts.

4.4 Repairs and Maintenance

Repair and maintenance account for about 11% of the owner-operators' revenue. In order to reduce costs and maximize profits, about 3/4 of owner-operators do their own repair and maintenance. They are not only good drivers, they are also good mechanics. When a major overhaul is required, half of these owner-operators hire someone else to do it. The repair and maintenance not done by the owner-operators themselves is split almost equally between dealers who sell the trucks and garages specializing in truck repairs.

Three quarters of owner operators purchase their repair parts from dealers, but one third of them buy repair parts from independent shops specializing in trucks. Many of these independent garages sell items not manufactured by the original equipment manufacturers, at lower prices than are quoted by the dealers. Brake shoes or pads, filters, oil, clutch plates, and V-belts would be typical items.

5. ATTITUDES OF OWNER-OPERATORS

Questions 8,9,10, and 12 indicate selected attitudes of owner-operators.

Question No.8: Which of the following subjects would you like to see covered in Trucking Canada?

The 13 topics selected represent a consensus of persons very familiar with owner-operators' interests. Their opinions would seem to be correct because all subjects except #14 were selected by at least 1/3 of the respondents. Two closely related topics, #7, "How to keep operating costs down" and #8, "Maintenance tips" were identified by over half of the respondents. These two responses are related directly to the net income of the owner-operator. In their highly competitive market, owner-operators must bid low to get the trips to increase their income but must reduce costs to increase their profit. Reducing costs becomes their number two priority after increasing sales; but good maintenance keeps their vehicle on the road earning income. The third most popular topic "Truck and equipment tests and specs" helps the owner-operator to select the most reliable equipment with the least operating cost. The general conclusion to be drawn from responses to question number 8 is that owner-operators try as a first priority to increase their profits.

Question No.9: Owner-operators get trucking information from many sources. How useful do you find the following?

Most owner-operators selected trucking magazines as the most useful source of information on their industry. There was no way of estimating any bias in this response because the survey was being conducted by a trucking magazine.

Other owners of trucks and dealers were the next most important sources of information. By contrast, not only was government not a very useful source of information but the high portion of responses saying "not useful" or "no opinion" suggests that owner-operators do not expect government to provide them information.

Question No.10: How interested are you in participating in programs that could show you how to reduce fuel and operating costs if these were provided by?

Most owner-operators were interested in programs run by truck and equipment dealers, or trucking magazines. By contrast, owner-operators were not very interested in programs offered by government. Part of the explanation for this response could be that owner-operators have very little contact with governmental organizations, and do not expect governmental programs aimed at reducing fuel and operating costs.

Question No.12: When buying a new truck or tractor, how important are the following features?

Nearly all owner-operators selected reliablity as the most important feature because, more than any other feature, it has a very big impact on their profits. Owner-operators selected in second place the engine and transmission because they are major components of reliability, operating costs, and adaptability to the purchaser's application. Their third feature in importance is fuel-economy because fuel accounts for about 11% of owner-operator's income and can be minimized at the time of purchase. Price is the fourth most important factor, followed closely by dealer support. Owner-operators rely on dealers for spare parts, and emergency repairs, both important in keeping the truck on the road.

The validity of these responses may be partly evaluated by comparing them with the responses discussed in "Trends in the Canadian Truck Market."[2] This comparison shows that the 5 most important features in both studies are identical but that the sequence of importance is slightly different indicating that the priorities of owner-operators are slightly different than the priorities of large fleet owners.

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1. D.S. Van Dusen, Trends in The Canadian Truck Market, TE-86-2A, Transportation Energy Division, Energy, Mines and Resources Canada, page 26, July 1985.

6. HOW REPRESENTATIVE IS THE SAMPLE?

One way of determining the extent to which the sample is representative is to compare the percentage of each make of truck in the sample with its percentage market penetration. The following chart makes this comparison.

TABLE 2

MAKE	Tractors in Survey (%)	Table 5 Penetration[3] (%)	Trucks in Survey (%)
Ford	21	23	14
GMC & Chevrolet	13	20	10
IHC	16	25	13
Kenworth	12	6	17
Freightliner	8	9	13
Mack	10	11	12
Peterbilt	4	4	6
Western Star	8	2	11

The comparison shows similar ratios but the anomalies can be explained as follows:

1. The 14% of trucks being Fords is similar to its 15% penetration of the medium truck market.

2. The low representation of GMC and IHC occurs because their main target is the large truck fleets who purchase large quantities of trucks at low prices.

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1. D.S. Van Dusen, Trends in The Canadian Truck Market, TE-86-2A, Transportation Energy Division, Energy, Mines and Resources Canada, page 23, July 1985.

3. The higher representation of Kenworth and Freightliner occurs because these two companies have designed their trucks especially for owner-operators.

4. The high representation of Western Star occurs because it specializes in logging trucks especially for owner-operators.

A second way of determining the extent to which the sample is representative is to compare the percentage of respondents from each province with the annual sales of trucks in each province. The comparison in Table 3 shows similar ratios except that Quebec is under-represented. The explanation for this anomaly is that owner-operators in Quebec usually read a competing French language magazine whereas the attitude survey was conducted by an English language magazine.

A third way of determining the extent to which the sample is representative is to consider the proportion of the total population of owner-operators that responded to the questionnaire. Owner-operators typically invoice their customers between $0.90 and $2.00 per mile. Considering that the average number of miles driven per year is about 91,000 for tractors and 45,000 for trucks, one can estimate about 1,000 respondents, or at least 60% of the respondents, attained a gross income exceeding $100,000 per year. Catalogue 53-222 from Statistics Canada indicates 4,541 companies attained revenue between $100,000 and $500,000 in the year 1982. This figure is likely to exceed 5,000 by 1985. Therefore, one can conclude that approximately 20% of owner-operators with annual revenues of between $100,000 and $500,000 responded. This proportion is sufficiently high that unless some overwhelming factor has caused a strong bias in the answers to the questionnaire, one can conclude that the answers are sufficiently representative to be useful. No such overwhelming factor has yet been uncovered so the conclusion reached is that the answers to the questionnaire adequately indicate the attitudes of the owner-operators.

Table 3

Polk Canadian New Truck Registrations

MEDIUM	1985		1984		1983	
	Sales	%	Sales	%	Sales	%
Alta.	645	11.37	380	8.17	309	7.47
BC	434	7.65	487	10.47	387	9.35
Man.	343	6.05	340	7.31	270	6.53
NB	143	2.52	163	3.50	132	3.19
Nfld.	95	1.68	108	2.32	49	1.18
N.S.	173	3.05	152	3.27	93	2.25
Ont.	2877	50.73	2132	45.82	1945	47.01
PEI	38	0.67	35	0.75	38	0.92
Que.	590	10.40	461	9.91	445	10.76
Sask.	333	5.87	395	8.49	469	11.34
TOTAL	5671		4653		4137	

MEDIUM	1985		1984		1983	
	Sales	%	Sales	%	Sales	%
Alta.	4125	16.77	2108	11.40	1474	15.26
BC	1944	7.90	1323	7.16	747	7.73
Man.	953	3.87	635	3.43	210	2.17
NB	692	2.81	684	3.70	194	2.01
Nfld.	296	1.20	379	2.05	73	0.76
N.S.	559	2.27	515	2.79	264	2.73
Ont.	11186	45.47	8213	44.42	4310	44.63
PEI	134	0.54	73	0.39	54	0.56
Que.	3637	14.79	3560	19.25	1445	14.96
Sask.	1073	4.36	999	5.40	887	9.18
TOTAL	24599		18489		9658	

	Survey Responses	%
Alta.	315	18.01
BC	247	14.12
Man.	77	4.40
NB	45	2.57
Nfld.	20	1.14
NS	54	3.09
Ont.	882	50.43
PEI	18	1.03
Que.	44	2.52
Sask.	47	2.69
TOTAL	1749	

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APPENDIX I

DESCRIPTION OF THE DATA BASE

Input Data

The data entry form shown in Figure 1 is a sample questionnaire published in the July-August and September-October 1985 editions of Trucking Canada. The truck-drivers wrote their answers on the form and mailed it to Trucking Canada at the addresses shown on the form.

Manual Edit

The entry forms were then sorted into 3 groups:

1. perfectly completed forms
2. imperfectly completed forms
3. partially completed forms

Discarded were any recognized duplicates, and any forms so incomplete as to be non-useable. Where appropriate, notations in red were made on the forms to ease data entry into the computer.

Data Entry

The data base management package named "Manager", distributed by BMB Compuscience Canada Ltd. was used for file formatting, in an IBM-PC compatible computer using PC-DOS as the operating system. Screen formats corresponding closely to the data entry forms were used by data entry clerks to ensure that responses on the data entry form were correctly entered into the appropriate record. A tape back-up was continuously maintained.